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TechGrow T-2

CO_2 CONTROLLER

With external CO2 sensor, temperature sensor, relative humidity sensor and calibration function.

MANUAL

Software version: 1.60

Issued: 01-11-2014

TechGrow T-2
User manual

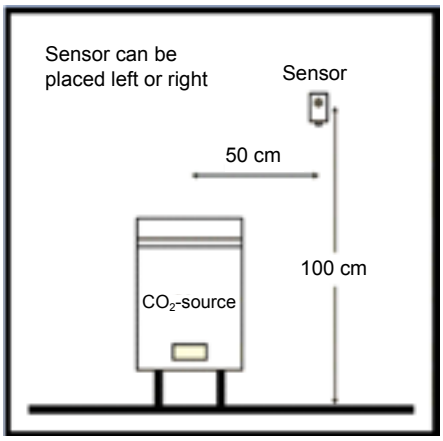
A full climate controller with a revolutionary fan control that responds to all TechGrow sensors.

SPECIAL FEATURES:

- Plug & Play, can be used in small to very large rooms.
- Extremely accurate external CO2 sensor, produced by SenseAir® Sweden, for CO2 measurement and Sensirion™ Switserland for temperature and humidity.
- Calibration function for CO2 and temperature.
- CO2 adjustable between 300 – 2000 ppm.
- The sensor takes a measurement every second.
- LED indicates when CO2 is being dosed.
- Measures CO2, temperature, humidity and light simultaneously.
- Regulates CO2 and humidity during the night.
- Switches the CO2 source (CO2 generator, CO2 cilinder) on/off using a 230V relay.
- Memory in case of power outages for setpoint and hysteresis.
- Suitable to connect fans up to 5000m3/hr.
- All set-, hysteresis- and alarm values of the sensors are separately adjustable.
- Shortcut menu for a quick summary of all settings.
- The fan-control has 2 adjustment settings: automatic and manual.
- The fan-control is adjustable in steps of 10% for all fans, pre-programmed for Torin™ and Lemmens fans.
- The external CO2 sensor has a built-in light sensor to automatically switch between day and night settings.
- Automatically detects broken cable or bad connection of the connected sensors.
- Connecting the sensor is done with a standard network cable (UTP). Included are 2 cables of 5 meter each.
- Possibility to connect the TechGrow AM-T: a SMS-module to remotely read values from your CO2 controller.

INSTALLATION:

1. It is recommended to mount the CO2 sensor on a wall close to the CO2 source, with a minimum distance of 50 cm. It is not advisable to place the sensor directly over the CO2 source if that source can reach very high temperatures (CO2 generator). The sensor must be placed approximately 1 meter above the floor. For this, use the enclosed mounting bracket.



2. It is not recommended to mount the Temp RH sensor in such a way that it catches full light. The housing of the sensor can reach high temperatures and wrong values could be shown. The sensor must be placed approximately +/- 1 meter above the floor. For this, use the enclosed mounting bracket.

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ATTENTION: please make sure that the light sensor (the milk-coloured cap on top of the CO2 sensor) can absorb light directly and is not obstructed by e.g. shelves or fixings, as then it will not be able to differentiate between day and night!

3. Mount the TechGrow T-2 controller to the wall with the supplied mounting bracket.
4. Connect the sensors to the TechGrow T-2 controller with the supplied UTP cables.
5. Plug the CO2 source into the socket of the TechGrow T-2 controller.
6. Plug the fan in to the socket of the TechGrow T-2 controller.
7. Plug the TechGrow T-2 controller in a 230V socket.
8. Ready!

OPERATING THE TECHGROW T-2 CO2 CONTROLLER:

When the CO2 value in a room drops below the set value (setpoint), the CO2 source will be activated. After a while, the CO2 value will rise and when it has reached the CO2 set value, the CO2 source will be deactivated again.

EXAMPLE:

The CO2 “set” is at 670.
The CO2 “+/-” is at 40.

The current CO2 value in the room is for example 733, which is higher than the CO2 set, so the CO2 source is deactivated. The red light is now turned off.

The CO2 gradually starts to drop to 670: still nothing happens.
Only when the value drops below the CO2 “set” minus the CO2 “+/-”, which in this case is at 670 – 40 = 630, the CO2 source will be activated and the red light turns on.

The CO2 is now rising and, as soon as the value of 670 has been reached, the CO2 source will be deactivated again.

By adjusting the CO2 +/-, a stable atmosphere can be obtained. Factory settings: the CO2 is set at 700 ppm, the CO2 “+/-“ is set at 50.

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When activating the T-2 the following will appear on the display sequentially (foto 1):

- TechGrow T-2
- Software v 1.60

After 3 seconds, a menu will appear to select the desired language (photo 2):

- English
- Nederlands
- Deutsch or Espanol (depending on software-version)
- Francais

By rotating the Push&Turn Button (PTB) the desired language can be selected. After a push on this button, this language will be set as standard value. When restarting de T-2, the selected language will be used. If you do not change anything, the T-2 will proceed after 3 seconds using the previous language. Factory setting: Dutch

Brand menu (photo 3):

- Lemmens
- Torin
- Custom
- Push or wait

You can select the desired extractor manufacturer by moving the arrow with the PTB. With a push on the button you confirm your selection. You will then go to the Fan-menu automatically (see later on). If you are using another brand than Lemmens or Torin, please choose Custom and push the button (photo 3). To return to the main menu, the T-2 has to be switched off for at least 10 seconds. Then, switch T-2 back on.

1

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3

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Custom menu (photo 4):

- Adjust the box at 10%
- and push the button.
- See manual.

The fan is now switched off. Slowly turn the PTB until the fan has reached 10% of its maximum speed (according to your sense). Push the PTB again

The following will appear on the display (photo 5):

- Set the box at 90%
- and push the button.
- See manual.

The fan is now rotating slowly. Turn the PTB slowly until the fan´s speed is no longer increasing. This is the full 100% speed. Now turn the PTB back to 90% (according to your sense). Push the button to confirm.

The following will appear on the display for 3 seconds (photo 6):

- The box is now
- adjusted.

4

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6

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User manual

When you are using a Torin or Lemmens fan

The Brand menu (photo 7):
- Lemmens
- Torin
- Custom
- Push or wait

Select your brand, then select your fan (photo 8):
- Select fan
- 2500 m3
- Push or wait 3 seconds.

By rotating the PTB the desired fan can be selected. After a push on the button the selected fan will be set as standard. When restarting the T-2 this fan setting will be used as standard. If you do not change anything, the T-2 will proceed after 3 seconds using the previous fan setting. Options are from 1000 – 5000 m3/hour.

Next is the Calibration menu (photo 9):
- CO2 calibration
- Continue ?
- Yes
- No

This option is standard set at “No”. If you do wish to calibrate the CO2 sensor, please read the Calibration manual first. Normally, the sensor does not need calibration. Only in exceptional cases calibration will be needed. Wait for 3 seconds or press “No”, to enter the main menu.

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9

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The previous menus are only accessible after powering up the T-2. Once the T-2 is in the main menu mode, no access is possible to beforementioned menus. To return to the main menu the T-2 has to be switched off for at least 20 seconds and then switched on again.

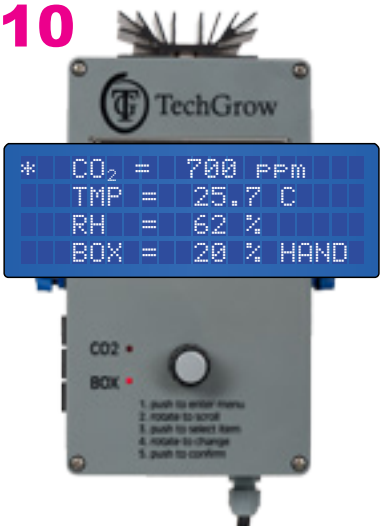
Main menu (photo 10)

- (*) CO2 = 700 ppm
- TMP = 25.7 C
- RH = 62 %
- BOX = 20 % Manual

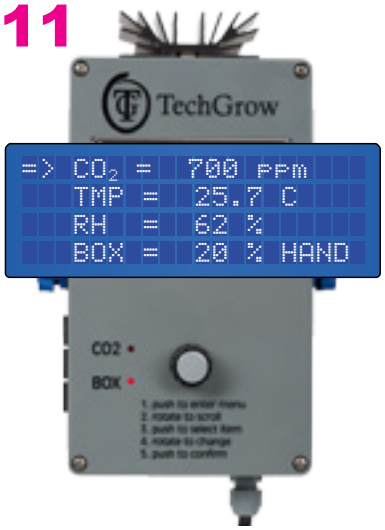
Line 1: The current value of the CO2 level is displayed. An asterisk (*) means that the light is detected. If the asterisk is not shown, it means no light is detected.
Line 2: The current temperature.
Line 3: The current relative humidity.
Line 4: The current speed of the fan. Next to it is the current state of the fan control.

To change the settings, push the PTB and rotate until the arrow appears next to the desired submenu and push the PTB again (to confirm). If you do not change anything, the arrow will disappear after 5 seconds and rotating the button will have no effect (photo 11).

10



11



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CO2-menu (photo 12)

- CO2 set 700 ppm
- CO2 +/- 50 ppm
- CO2 ALARM
- >> NEXT >>

Line 1: CO2 set. A blinking square appears in front of the value of the CO2 set. By rotating the button you can change the value (range: 300-2000). With a push on the PTB you confirm the value. If you do not change anything, the blinking square will disappear after 3 seconds and you will be able to make a different choice. If you do nothing again, the arrow will disappear after 3 seconds and you will return to the main menu.

Line 2: CO2 +/-. Operates the same as line 1, only for adjusting the hysteresis (bandwidth). The range is 10 - 200.

Line 3: CO2 ALARM. Here, the alarm value for the CO2 level can be adjusted (photo 13).

- CO2 ALARM
- CO2 = 1500 ppm
- << BACK <<

When the alarm value is reached, the fan will rotate faster until “auto max” position.

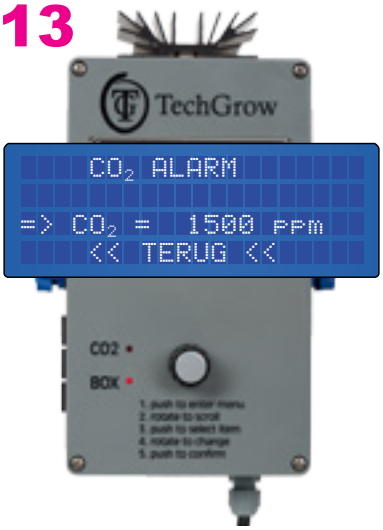
Line 4: >>NEXT>>. Here you can find the minimum and maximum values of the CO2 value (photo 14).

- CO2 Min 496 ppm
- CO2 Max 981 ppm
- Reset Min/Max
- << BACK <<

To set the Min- or Max value at the current CO2 value: select by rotating the PTB, then push. Select <<BACK<< to return to the main menu.

12

13



14

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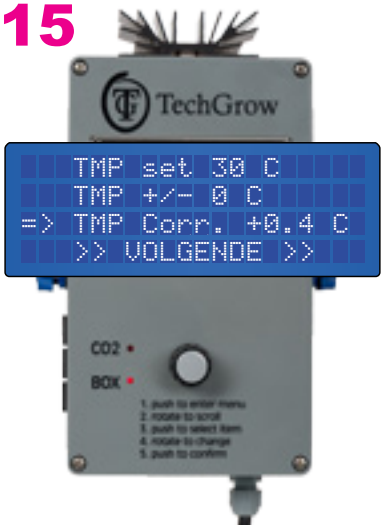
TMP-menu (photo 15)
- TMP set 30 C
- TMP +/- 1.5 C
- TMP Corr. +0.4 C
- >> NEXT >>

Line 1. Here you can adjust the desired temperature.
Line 2. Here you can adjust the bandwith (HYSTERESIS).
Line 3. Although the temperature sensor is very accurate, it can be desirable to have the indication equal to other measurement equipment. By using TMP Corr you can adjust the indication in steps of 0.1 °C from -5.0 °C up to +5.0 °C
Line 4. >> NEXT >>.

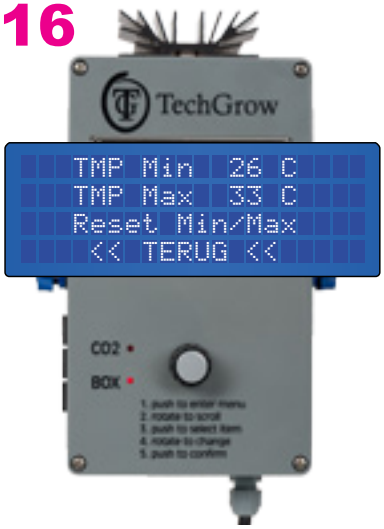
Min – Max menu (photo 16)
- TMP Min 26 C
- TMP Max 33 C
- Reset Min/Max
- << BACK <<

Select and push to set the Min- or Max- value to the current temperature. Select << BACK << to return to the main menu.

15



16



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RH-menu (photo 17)

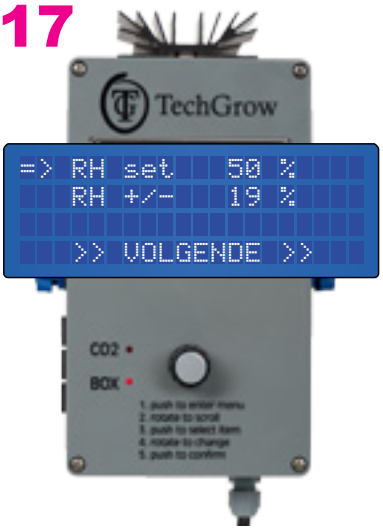
- RH set 50 %
- RH +/- 3 %
- >> NEXT >>

Line 1. Here, you can adjust the desired humidity value
Line 2. Here, you can adjust the desired bandwith (HYSTERESIS).
Line 3. >>NEXT>>.

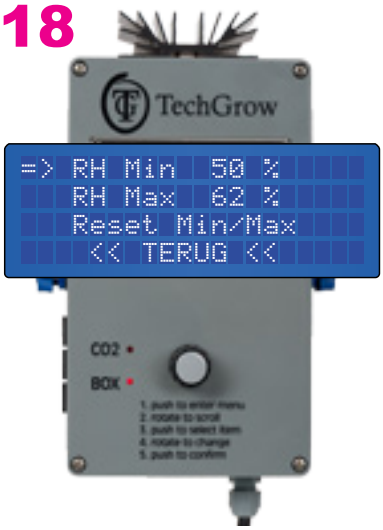
Go to Min – Max menu (photo 18)

- RH Min 50 %
- RH Max 62 %
- Reset Min/Max
- << BACK <<

17



18



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User manual

BOX-menu (photo 19)

- BOX perc. 20 %
- BOX A/M Manual
- Auto MAX 90 %
- << BACK <<

Line 1. Here, you can set the idle power of the fan. If all measured values are normal the fan will operate at this speed.

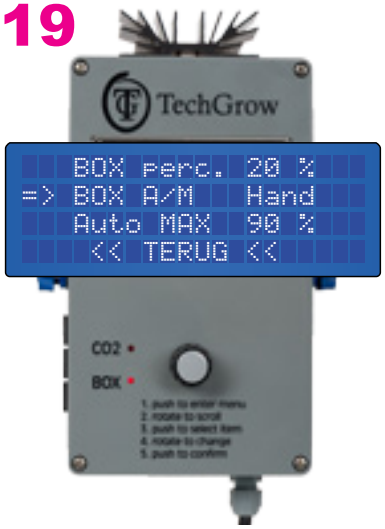
Line 2. Here you can select “Automatic-” or “Manual” control of the fan. In “Auto”, the fan will rotate faster automatically if a measured value is too high. That is, if the CO2 is higher than (CO2 set + CO2 +/-) or if TMP is higher than (TMP set + TMP +/-) or if RH is higher than (RH set + RH +/-). Every 5 seconds the fan will speed up 10% until the value AutoMax has been reached. If the measured values are normal again, the fan will automatically rotate slower until the inactive percentage has been reached.

NOTE: the Auto-adjustment only responds to CO2 if the lights are turned off. When the lights are turned on, the Auto-adjustment will not respond to the CO2. However, for TMP and RH the Auto adjustment functions all the time.
In “Manual” mode the fan will always rotate according to BOXperc. speed. Only when the CO2 alarm value is exceeded, the fan will rotate faster until AutoMax has been reached. This will occur either with the lights turned on or off.

Line 3. Adjustment of the maximum fan speed in “Auto” (see Line 2).

Line 4. Return to main menu.

19



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The Quick menu's
The Quick-menus give a compact overview of all settings. You do not have to go through all the menu's to see how your adjustments are set.
The Quick menu's can only be reached from the main menu. Rotate the PTB for at least 10 clicks within 1 second to left or right. That is, turn the PTB quite fast.

Turn right
First, an overview of the set values and the hysteresis of CO2, TMP, and RH will be shown (photo20).
- CO2-SET 850 +- 40
- TMP-SET 29 +- 2
- RH-SET 65 +- 3
- Push = Exit

Turn the PTB 1 click to the right to see all Min- values (photo 21):
- CO2-MIN 583 ppm
- TMP-MIN 26 C
- RH-MIN 50 %
- Push = Exit

Turn the PTB another click to the right to see all Max-values (photo 22):
- CO2-MAX 1233 ppm
- TMP-MAX 32 C
- RH-MAX 69 %
- Push = Exit

Turn the PTB another click to the right to see all Box-settings (photo 23):
- BOX perc. 20 %
- BOX A/M Auto
- Auto MAX 90 %
- Push = Exit

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23

With another click to the right you will return to Set-values, by turning left you will return to the Max-values. This way, it becomes possible to go through the quick-menu's. By pushing the PTB you will return to the main menu. If you do not change anything, the T-2 will return to the quick menu after 30 seconds.

Turn left:

Gives the same overview as turning to the right, only now sorted by the same measurement value (photo 24):

- CO2-SET = 850 ppm
- CO2 +/- = 50 ppm
- CO2-ALM = 1500 ppm
- Push = Exit

Turn the PTB 1 click to the left (photo 25):

- TMP-SET = 29 C
- TMP +/- = 2 C
- Push = Exit

Turn the PTB another click to the left (photo 26):

- RH-SET = 65 %
- RH +/- = 3 %
- Push = Exit

Turn the PTB another click to the left to go to Box-menu (photo 27):

- BOX perc. 20 %
- BOX A/M Auto
- Auto MAX 90 %
- Push = Exit

24

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26

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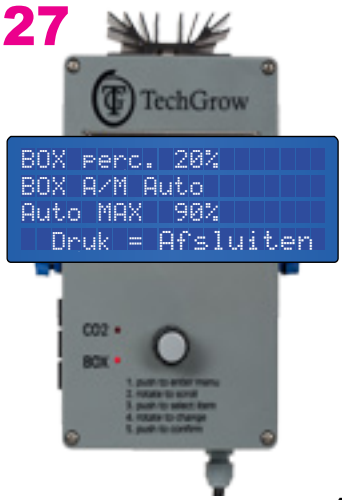

TechGrow T-2
User manual

ASSEMBLING THE MOUNTING BRACKETS

CONTROLLER

TEMP RH SENSOR

CO2 SENSOR

TECHNICAL SPECIFICATIONS

Power supply: 110 or 230 Volt (automatic), 50/60 Hz
Consumption: 3 Watt (with sensor, without CO2-bron)
Maximum power fan: 1400 W (max 6A)
Maximum capacity fan: 5000 m3/hour
Adjustment range: CO2 set: 300 to 2000 ppm
Adjustment range CO2 +/-: 10 to 200 ppm (advice 50 ppm)
Measurement frequency: 1 measurement per second

Humi-Dual
Humidify
Dehumidify
• Plug & Play
• Extremely accurate external humidity sensor
• Switches the humidifier and dehumidifier
• Adjustable between 10 - 90% relative humidity
Humi-Dual

55 % RH
• Plug & Play
• Controls your humidifier
• Adjustable between 10 to 90% relative humidity
• LED indicator
Humi Up

• Placeable in any room
• Measures CO_2 value, temperature and humidity
• Backlight for working in dark areas
• CO_2 warning alarm
Portable CO_2 Meter HS-2

Asymmetrical Timer AT-1
NIGHT
• Set your preferred day/night cycle.
• No longer bound to 24-hour timers.
• Count-down timer till next switching moment
• Change the switch-over time daily
Asymmetrical Timer

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TechGrow
T-1 & T-2 CO_2 Sensor
CALIBRATION PROCEDURE

MANUAL

software version: 2.20

Issued: 01-11-2014

TechGrow CO_2 Sensor
calibration procedure

The TechGrow T-1 and T2 controllers come with a unique calibration feature that allows you to calibrate the device in case of large deviation.

Only calibrate the sensor if you suspect a deviation. Experience has shown that the SenseAir® sensors we use function without any problems for at least two years without calibration being necessary.

The sensors are calibrated with the highest precision during manufacture, however it could occur after a year in use that the sensor shows a deviation and needs to be calibrated.

PREPARATION FOR CALIBRATION:

1. Place the CO2 sensor in a CO2 neutral environment, such as a balcony or your garden for at least half an hour, or in a sealed and well-ventilated room for at least 8 hours.

This is best done during daytime, because the CO2 values will be closest to 400 ppm. During nighttime, plants and trees emit CO2 and the outdoor CO2 values will be closer to 450 ppm.

If the minimal value is not much lower than 370 ppm or much higher than 430 ppm, it is not necessary to calibrate the sensor.

That is because the value of neutral/clean outdoor air is between 380 ppm and 420 ppm. A deviation of +/- 5% is common with this type of measurement equipment. Please keep this in mind when setting your CO2 values.

In case of a greater deviation, calibration is necessary. Please continue with step 2.

2. To calibrate the sensor, you have to switch DIP switch 1 (see image) from position 0 to position 1 (ON). This is to prevent any unintentional calibration caused by any electronic/dimmable control gear, which can cause much disturbance to our measurement equipment. This manual security has been built in for exactly that reason.

3. Open the sensor case (4 screws, see image A).
4. Locate DIP switch 1 (see image B).
5. Switch DIP switch 1 to position 1 (ON) using a pen or a small screwdriver (image C).
6. The sensor can now be calibrated.

image: A

image: B

image: C

CALIBRATION MENU

1. Disconnect the power supply to the T-1/T-2 CO2-controller.
2. Re-connect the power after 20 seconds.
3. The display will first show the type and software version of the controller.
4. Next, a language menu is shown (photo 1); after 5 seconds the question appears to continue calibrating. Choose Yes (photo 2). If you do nothing, or choose No, the controller returns to the main menu without calibration.

CALIBRATION PROCEDURE

The calibration menu guides you step by step through the procedure.
Note: step 5 is your last chance to terminate the calibration and return to the main menu without making any modifications.

1. “CO2 calibration - continue” > Yes/No (photo 2).
2. “Place DIP switch 1 to position 1 (ON)! - Consult the manual” > Continue (photo 3).
3. “Place the sensor outside and wait 20 minutes” > Continue/Stop (photo 4).
4. “Start calibrating sensor at 400 ppm” > Yes/No (photo 5).
5. “IS THE SENSOR OUTSIDE?” > Push button for 10 seconds to start calibration (photo 6).
   Arrows (>) will appear on the second line of the display. If the button is released before the line is completely filled, you will be returned to the main menu. The sensor will not have been calibrated (photo 7).
6. “Calibration is starting - Ready in 20 minutes” (photo 8).
7. During these 20 minutes, a message will be displayed every 10 seconds: “Please stay away from the sensor!” - “Do not forget to switch back the DIP switch!”.
   Every minute, an asterisk will appear on the last line of the display (photo 9).
8. After 20 minutes, the message “Calibration 400 OK” will appear and the controller will automatically return to the main menu (photo 10).
9. NOW YOU HAVE TO SWITCH DIP SWITCH 1 BACK TO POSITION 0! (image B).
10. Close the sensor case (image A).

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push for 10 seconds

8

9

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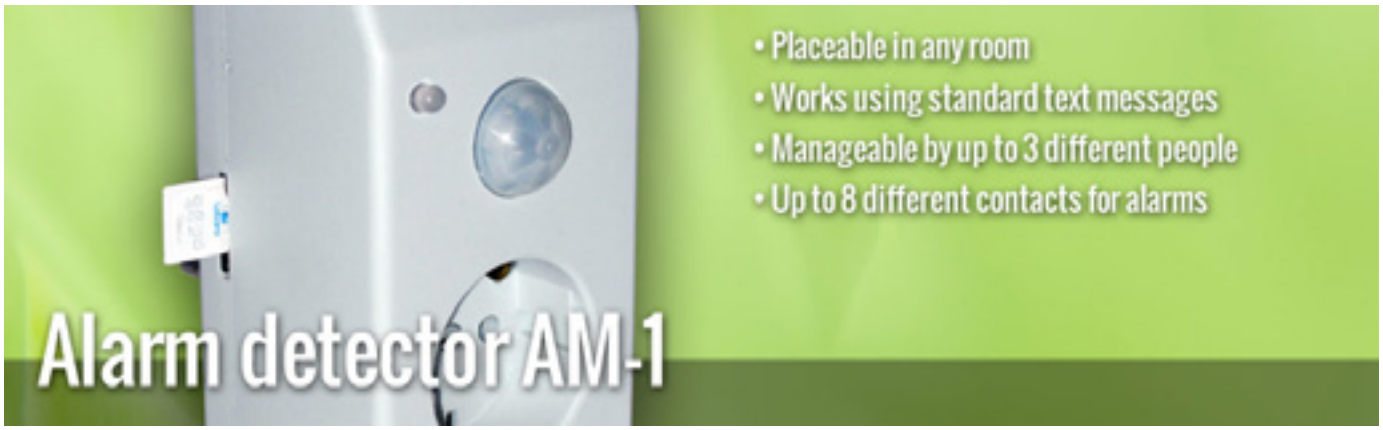
• Compact and accurate portable handmeter
• Measures CO_2 value and temperature
• CO_2 warning alarm
• Calibration function for CO_2
Portable CO_2 Meter HS-1


• Placeable in any room
• Works using standard text messages
• Manageable by up to 3 different people
• Up to 8 different contacts for alarms
Alarm detector AM-1

• Plug & Play
• Extremely accurate CO_2 sensor
• Smallest of its kind
• Easy to use
CO_2 Controller T-Micro

• Back-up for up to 24 hours
• Works with any 12 Volt car battery
• Installed in a couple of minutes
• Optional: Mobile phone feedback module
Powerbox PB-600